Major Stormwater Management Plan
(Major SWMP)
For

Carnevale Subdivision
TPM 21133

Preparation/Revision Date:
November 18, 2010

Log No. 08-14-015

Prepared for:
Keith and Jodean Carnevale
1863 Harbison Canyon Rd.
El Cajon, CA 92019

Prepared by:
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The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan have been prepared under the direction of the following Registered Civil Engineer and meet the requirements of Regional Water Quality Control Board Order R9-2007-0001 and subsequent amendments.

Patricia McColl, RCE #38268

11-18-2010
Date

The Major Stormwater Management Plan (Major SWMP) must be completed in its entirety and accompany applications to the County for a permit or approval associated with certain types of development projects. To determine whether your project is required to submit a Major or Minor SWMP, please reference the County's Stormwater Intake Form for Development Projects.

Project Name:	Carnevale Subdivision
Project Location:	San Diego County
Permit Number (Land Development Projects):	TPM 21133
Work Authorization Number (CIP only):	N/A
Applicant:	Keith and Jodean Carnevale
Applicant's Address:	1863 Harbison Canyon Road El Cajon, CA 92109
Plan Prepared By (Leave blank if same as applicant):	David Evans and Associates
Preparer's Address:	110 W. A Street, Suite 1700 San Diego, CA 92101
Date:	January 22, 2009

The County of San Diego Watershed Protection, Storm Water Management, and Discharge Control Ordinance (WPO) (Ordinance No. 9926) requires all applications for a permit or approval associated with a Land Disturbance Activity to be accompanied by a Storm Water Management Plan (SWMP) (section 67.806.b). The purpose of the SWMP is to describe how the project will minimize the short and long-term impacts on receiving water quality. Projects that meet the criteria for a priority development project are required to prepare a Major SWMP.

Since the SWMP is a living document, revisions may be necessary during various stages of approval by the County. Please provide the approval information requested below.

Project Stages	Does the SWMP need revisions?		If YES, Provide Revision Date
	YES	NO	
TPM		x	
	x		6-2-2010
	x		8-17-2010
Construction	x		TBD

Instructions for a Major SWMP can be downloaded at
http://www.sdcounty.ca.gov/dpw/watersheds/susmp/susmp.html

Completion of the following checklists and attachments will fulfill the requirements of a Major SWMP for the project listed above.

STEP 1
PRIORITY DEVELOPMENT PROJECT DETERMINATION

TABLE 1: IS THE PROJECT IN ANY OF THESE CATEGORIES?

Yes	No **x**	**A**	**Housing subdivisions of 10 or more dwelling units.** Examples: single-family homes, multi-family homes, condominiums, and apartments.
Yes	No **x**	**B**	**Commercial—greater than one acre.** Any development other than heavy industry or residential. Examples: hospitals; laboratories and other medical facilities; educational institutions; recreational facilities; municipal facilities; commercial nurseries; multi-apartment buildings; car wash facilities; mini-malls and other business complexes; shopping malls; hotels; office buildings; public warehouses; automotive dealerships; airfields; and other light industrial facilities.
Yes	No **x**	**C**	**Heavy industry—greater than one acre.** Examples: manufacturing plants, food processing plants, metal working facilities, printing plants, and fleet storage areas (bus, truck, etc.).
Yes	No **x**	**D**	**Automotive repair shops.** A facility categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.
Yes	No **x**	**E**	**Restaurants.** Any facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is greater than 5,000 square feet. Restaurants where land development is less than 5,000 square feet shall meet all SUSMP requirements except for structural treatment BMP and numeric sizing criteria requirements and hydromodification requirements.
Yes **x**	No	**F**	**Hillside development greater than 5,000 square feet.** Any development that creates 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions, where the development will grade on any natural slope that is twenty-five percent or greater.
Yes **x**	No	**G**	**Environmentally Sensitive Areas (ESAs).** All development located within or directly adjacent to or discharging directly to an ESA (where discharges from the development or redevelopment will enter receiving waters within the ESA), which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition. “Directly adjacent” means situated within 200 feet of the ESA. “Discharging directly to” means outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands.
Yes	No **x**	**H**	**Parking lots 5,000 square feet or more** or with 15 or more parking spaces and potentially exposed to urban runoff.
Yes **x**	No	**I**	**Street, roads, highways, and freeways.** Any paved surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles, and other vehicles.
Yes	No **x**	**J**	**Retail Gasoline Outlets (RGOs)** that are: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.

To use the table, review each definition A through K. If any of the definitions match, the project is a Priority Development Project. Note some thresholds are defined by square footage of impervious area created; others by the total area of the development. Please see special requirements for previously developed sites and project exemptions on page 6 of the County SUSMP.

STEP 2
PROJECT STORMWATER QUALITY DETERMINATION

Total Project Site Area 12.44 ac (Acres or ft^2)

Estimated amount of disturbed acreage: 2.04 ac (Acres or ft^2)

(If >1 acre, you must also provide a WDID number from the SWRCB) WDID: N/A

Complete A through C and the calculations below to determine the amount of impervious surface on your project before and after construction.

A. Total size of project site: 12.44 ac (Acres or ft^2)

B. Total impervious area (including roof tops) before construction 0.45 ac (Acres or ft^2)

C. Total impervious area (including roof tops) after construction 1.62 ac (Acres or ft^2)

Calculate percent impervious before construction: B/A = 3.6 %
Calculate percent impervious after construction: C/A = 1.3 %

Please provide detailed descriptions regarding the following questions:

TABLE 2: PROJECT SPECIFIC STORMWATER ANALYSIS

1.	Please provide a brief description of the project.
This is a four (4) lot residential subdivision with a remainder lot.	
2.	Describe the current and proposed zoning and land use designation.
Semi-rural residential	
3.	Describe the pre-project and post-project topography of the project. (Show on Plan)
The proposed project is located on a mild to steep hill side.	
4.	Describe the soil classification, permeability, erodibility, and depth to groundwater for LID and Treatment BMP consideration. (Show on Plan) If infiltration BMPs are proposed, a Geotechnical Engineer must certify infiltration BMPs in Attachment E.
A geotechnical report has not yet been completed for the project site. Per the San Diego County Soils Map, the area is composted of Type B soil. Type B soil is considered to be a moderately permeable, well draining soil. If hazardous or contaminated soils are encountered during the geotechnical investigation, they will be removed prior to any construction.	
5.	Describe if contaminated or hazardous soils are within the project area. (Show on Plan)
There is no contaminated or hazardous soil within the project area.	
6.	Describe the existing site drainage and natural hydrologic features. (Show on Plan)
During dry months, Harbison Canyon Creek remains dry through the project area. There is one drainage sub-basin of the overall creek basin that contributes runoff through the subject property to the creek. The project basin only accounts for 0.3% of the total Harbison Canyon Creek basin.	
7.	Describe site features and conditions that constrain, or provide opportunities for stormwater control, such as LID features.
The steep nature of the terrain both constrains and provides opportunities for stormwater control. All proposed driveway locations shall slope towards a vegetated swale along the entire length of the driveway, Type B soil allows permeation, cut and fill areas have been as minimized as possible and have been rounded to reduce concentrated flows and concentrated flows will be collected in stabilized drains or channels.	
8.	Is this project within the environmentally sensitive areas as defined on the maps in Appendix A of the *County of San Diego Standard Urban Storm Water Mitigation Plan for Land Development and Public Improvement Projects*?
(Yes)	No
9.	Is this an emergency project?
Yes	(No)

CHANNELS & DRAINAGES

Complete the following checklist to determine if the project includes work in channels.

TABLE 3: PROJECT SPECIFIC STORMWATER ANALYSIS

No.	CRITERIA	YES	NO	N/A	COMMENTS
1.	Will the project include work in channels?	x			If YES go to 2 If NO go to 13.
2.	Will the project increase velocity or volume of downstream flow?		x		If YES go to 6.
3.	Will the project discharge to unlined channels?	x			If YES go to 6.
4.	Will the project increase potential sediment load of downstream flow?				If YES go to 6.
5.	Will the project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect downstream channel stability?				If YES go to 8.
6.	Review channel lining materials and design for stream bank erosion.	x			Continue to 7.
7.	Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity.	x			Continue to 8.
8.	Include, where appropriate, energy dissipation devices at culverts.		x		Continue to 9.
9.	Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour.	x			Continue to 10.
10.	Include, if appropriate, detention facilities to reduce peak discharges.		x		Continue to 11.
11.	“Hardening“ natural downstream areas to prevent erosion is not an acceptable technique for protecting channel slopes, unless pre-development conditions are determined to be so erosive that hardening would be required even in the absence of the proposed development.			x	Continue to 12.
12.	Provide other design principles that are comparable and equally effective.	x			Continue to 13.
13.	End	x			

TEMPORARY CONSTRUCTION BMPS

Please check the construction BMPs that may be implemented during construction of the project. The applicant will be responsible for the placement and maintenance of the BMPs incorporated into the final project design.

- [x] Silt Fence
- [x] Fiber Rolls
- [ ] Street Sweeping and Vacuuming
- [ ] Storm Drain Inlet Protection
- [ ] Stockpile Management
- [ ] Solid Waste Management
- [x] Stabilized Construction Entrance/Exit
- [ ] Dewatering Operations
- [ ] Vehicle and Equipment Maintenance
- [ ] Desilting Basin
- [x] Gravel Bag Berm
- [x] Sandbag Barrier
- [x] Material Delivery and Storage
- [x] Spill Prevention and Control
- [x] Concrete Waste Management
- [ ] Water Conservation Practices
- [x] Paving and Grinding Operations
- [x] Any minor slopes created incidental to construction and not subject to a major or minor grading permit shall be protected by covering with plastic or tarp prior to a rain event, and shall have vegetative cover reestablished within 180 days of completion of the slope and prior to final building approval.

EXCEPTIONAL THREAT TO WATER QUALITY DETERMINATION

Complete the checklist below to determine if a proposed project will pose an "exceptional threat to water quality," and therefore require Advanced Treatment Best Management Practices during the construction phase.

TABLE 4: EXCEPTIONAL THREAT TO WATER QUALITY DETERMINATION

No.	CRITERIA	YES	NO	INFORMATION
1.	Is all or part of the proposed project site within 200 feet of waters named on the Clean Water Act (CWA) Section 303(d) list of Water Quality Limited Segments as impaired for sedimentation and/or turbidity? Current 303d list may be obtained from the following site: http://www.swrcb.ca.gov/tmdl/docs/303dlists2006/approved/r9_06_303d_reqtmdls.pdf		x	If YES, continue to 2. If NO, go to 5.
2.	Will the project disturb more than 5 acres, including all phases of the development?			If YES, continue to 3. If NO, go to 5.
3.	Will the project disturb slopes that are steeper than 4:1 (horizontal: vertical) with at least 10 feet of relief, and that drain toward the 303(d) listed receiving water for sedimentation and/or turbidity?			If YES, continue to 4. If NO, go to 5.
4.	Will the project disturb soils with a predominance of USDA-NRCS Erosion factors kf greater than or equal to 0.4?			If YES, continue to 6. If NO, go to 5.
5.	Project is not required to use Advanced Treatment BMPs.	x		Document for Project Files by referencing this checklist.
6.	Project poses an "exceptional threat to water quality" and is required to use Advanced Treatment BMPs.			Advanced Treatment BMPs must be consistent with WPO section 67.811(b)(20)(D) performance criteria

Exemption potentially available for projects that require advanced treatment: Project proponent may perform a Revised Universal Soil Loss Equation, Version 2 (RUSLE 2), Modified Universal Soil Loss Equation (MUSLE), or similar analysis that shows to the County official's satisfaction that advanced treatment is not required

STEP 3
HYDROMODIFICATION DETERMINATION

The following questions provide a guide to collecting information relevant to hydromodification management issues.

TABLE 5: HYDROMODIFICATION DETERMINATION

	QUESTIONS	YES	NO	Information
1.	Will the proposed project disturb 50 or more acres of land? (Including all phases of development)		x	If YES, continue to 2. If NO, go to 6.
2.	Would the project site discharge directly into channels that are concrete-lined or significantly hardened such as with rip-rap, sackcrete, etc, downstream to their outfall into bays or the ocean?			If NO, continue to 3. If YES, go to 6.
3.	Would the project site discharge directly into underground storm drains discharging directly to bays or the ocean?			If NO, continue to 4. If YES, go to 6.
4.	Would the project site discharge directly to a channel (lined or un-lined) and the combined impervious surfaces downstream from the project site to discharge at the ocean or bay are 70% or greater?			If NO, continue to 5. If YES, go to 6.
5.	Project is required to manage hydromodification impacts.			Hydromodification Management Required as described in Section 67.812 b(4) of the WPO.
6.	Project is not required to manage hydromodification impacts.	x		Hydromodification Exempt. Keep on file.

An exemption is potentially available for projects that are required (No. 5. in Table 5 above) to manage hydromodification impacts: The project proponent may conduct an independent geomorphic study to determine the project's full hydromodification impact. The study must incorporate sediment transport modeling across the range of geomorphically-significant flows and demonstrate to the County's satisfaction that the project flows and sediment reductions will not detrimentally affect the receiving water to qualify for the exemption.

STEP 4
POLLUTANTS OF CONCERN DETERMINATION

WATERSHED

Please check the watershed(s) for the project.

	San Juan 901		Santa Margarita 902		San Luis Rey 903		Carlsbad 904
	San Dieguito 905		Penasquitos 906		San Diego 907	x	Sweetwater 909
	Otay 910		Tijuana 911		Whitewater 719		Clark 720
	West Salton 721		Anza Borrego 722		Imperial 723		

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

HYDROLOGIC SUB-AREA NAME AND NUMBER(S)

Number	Name
909.23	Dehesa Hydrologic Sub Area

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

SURFACE WATERS that each project discharge point proposes to discharge to. List the impairments identified in Table 7.

SURFACE WATERS (river, creek, stream, etc.)	Hydrologic Unit Basin Number	Impairment(s) listed [303(d) listed waters or waters with established TMDLs]	Distance to Project
Harbison Canyon Creek	9.23	n/a	Crosses project site.

http://www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303dlists2006/epa/r9_06_303d_reqtmdls.pdf

GROUND WATERS

Ground Waters	Hydrologic Unit Basin Number	MUN	AGR	IND	PROC	GWR	FRESH	POW	REC1	REC2	BIOL	WARM	COLD	WILD	RARE	SPWN
Mid Sweetwater	9.20	x	x	x												

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

+ Excepted from Municipal ● Existing Beneficial Use ○ Potential Beneficial Use

PROJECT ANTICIPATED AND POTENTIAL POLLUTANTS

Using Table 6, identify pollutants that are anticipated to be generated from the proposed priority project categories. Pollutants associated with any hazardous material sites that have been remediated or are not threatened by the proposed project are not considered a pollutant of concern.

TABLE 6: ANTICIPATED AND POTENTIAL POLLUTANTS GENERATED BY LAND USE TYPE

	General Pollutant Categories								
PDP Categories	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P	X
Commercial Development 1 acre or greater	P(1)	P(1)		P(2)	X	P(5)	X	P(3)	P(5)
Heavy industry /industrial development	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	
Hillside Development >5,000 ft	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Retail Gasoline Outlets			X	X	X	X	X		
Streets, Highways & Freeways	**X**	**P(1)**	**X**	**X(4)**	**X**	**P(5)**	**X**		

X = anticipated
P = potential
(1) A potential pollutant if landscaping exists on-site.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

PROJECT POLLUTANTS OF CONCERN SUMMARY TABLE

Please summarize the identified project pollutant of concern by checking the appropriate boxes in the table below and list any surface water impairments identified. Pollutants anticipated to be generated by the project, which are also causing impairment of receiving waters, shall be considered the primary pollutants of concern. For projects where no primary pollutants of concern exist, those pollutants identified as anticipated shall be considered secondary pollutants of concern.

TABLE 7: PROJECT POLLUTANTS OF CONCERN

Pollutant Category	Anticipated (X)	Potential (P)	Surface Water Impairments
Sediments	**X**		
Nutrients		**P**	
Heavy Metals	**X**		
Organic Compounds	**X**		
Trash & Debris	**X**		
Oxygen Demanding		**P**	
Substances	**X**		
Oil & Grease	**X**		
Bacteria & Viruses			
Pesticides			

STEP 5

LID AND SITE DESIGN STRATEGIES

Each numbered item below is a Low Impact Development (LID) requirement of the WPO. Please check the box(s) under each number that best describes the LID BMP(s) and Site Design Strategies selected for this project.

TABLE 8: LID AND SITE DESIGN

1. Conserve natural Areas, Soils, and Vegetation		
	x	Preserve well draining soils (Type A or B)
		Preserve Significant Trees
		Preserve critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions
		Other. Description:
2. Minimize Disturbance to Natural Drainages		
	x	Set-back development envelope from drainages
	x	Restrict heavy construction equipment access to planned green/open space areas
		Other. Description:
3. Minimize and Disconnect Impervious Surfaces (see 5)		
		Clustered Lot Design
	x	Items checked in 5?
		Other. Description:
4. Minimize Soil Compaction		
	x	Restrict heavy construction equipment access to planned green/open space areas
		Re-till soils compacted by construction vehicles/equipment
	x	Collect & re-use upper soil layers of development site containing organic Materials
		Other. Description:
5. Drain Runoff from Impervious Surfaces to Pervious Areas		
		<u>LID Street & Road Design</u>
		Curb-cuts to landscaping
	x	Rural Swales
		Concave Median
		Cul-de-sac Landscaping Design
		Other. Description:
		<u>LID Parking Lot Design</u>
		Permeable Pavements
		Curb-cuts to landscaping
		Other. Description:
		<u>LID Driveway, Sidewalk, Bike-path Design</u>
		Permeable Pavements
	x	Pitch pavements toward landscaping
		Other. Description:
		<u>LID Building Design</u>
		Cisterns & Rain Barrels
		Downspout to swale
		Vegetated Roofs
		Other. Description:
		<u>LID Landscaping Design</u>
		Soil Amendments
	x	Reuse of Native Soils

	x	Smart Irrigation Systems
		Street Trees
		Other. Description:
6. Minimize erosion from slopes		
		Disturb existing slopes only when necessary
	x	Minimize cut and fill areas to reduce slope lengths
		Incorporate retaining walls to reduce steepness of slopes or to shorten slopes
		Provide benches or terraces on high cut and fill slopes to reduce concentration of flows
	x	Rounding and shaping slopes to reduce concentrated flow
	x	Collect concentrated flows in stabilized drains and channels
		Other. Description:

STEP 6

SOURCE CONTROL

Please complete the checklist on the following pages to determine Source Control BMPs.
Below is instruction on how to use the checklist. (Also see instructions on page 40 of the *SUSMP*)

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.

2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your Source Control Exhibit in Attachment B.

3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in a table in your Project-Specific SUSMP.

Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternatives.

Subdivision and pad grading. There are no structures being built at this time, therefore, permanent BMPs are not required.

Use the format in Table 9 below to summarize the project Source Control BMPs.
Incorporate all identified Source Control BMPs in your Source Control Exhibit in Attachment B.

TABLE 9: PROJECT SOURCE CONTROL BMPS

Potential source of runoff pollutants	*Permanent source control BMPs*	*Operational source control BMPs*
Sediments	Vegetated Slopes	n/a

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
A. On-site storm drain inlets	Locations of inlets.	Mark all inlets with the words "No Dumping! Flows to Bay" or similar.	Maintain and periodically repaint or replace inlet markings.
			Provide stormwater pollution prevention information to new site owners, lessees, or operators.
			See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
			Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
B. interior floor drains and elevator shaft sump pumps		State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	Inspect and maintain drains to prevent blockages and overflow.
C. Interior parking garages.		State that parking garages floor drains will be plumbed to the sanitary sewer.	Inspect and maintain drains to prevent blockages and overflow.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
D1. Need for future indoor & structural pest control		Note building design features that discourage entry of pests.	Provide Integrated Pest Management information to owners, lessees, and operators.
D2. Landscape/ Outdoor Pesticide Use Note: Should be consistent with project landscape plan (if applicable).	Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. Show self-retaining landscape areas, if any. Show stormwater treatment facilities.	State that final landscape plans will accomplish all of the following: Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.	Maintain landscaping using minimum or no pesticides. See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Provide IPM information to new owners, lessees and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
E. Pools, spas, ponds, decorative fountains, and other water features.	Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet.	If the local municipality requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	See applicable operational BMPs in Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
F. Food service	For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	Describe the location and features of the designated cleaning area. Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
G. Refuse areas	Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent runon and show locations of berms to prevent runoff from the area. Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	State how site refuse will be handled and provide supporting detail to what is shown on plans. State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available onsite. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
H. Industrial processes.	Show process area.	If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	See Fact Sheet SC-10, "NonStormwaterDischarges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
I. Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent runon or run-off from area. Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of local Hazardous Materials Programs for: • Hazardous Waste Generation • Hazardous Materials Release Response and Inventory • California Accidental Release (CalARP) • Aboveground Storage Tank • Uniform Fire Code Article 80 Section 103(b) & (c) 1991 • Underground Storage Tank	See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC33, "Outdoor Storage of Raw Materials" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
J. Vehicle and Equipment Cleaning	Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle /equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shutoff to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	If a car wash area is not provided, describe measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. Car dealerships and similar may rinse cars with water only. See Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

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1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
K. Vehicle/Equipment Repair and Maintenance	Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater. Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the SUSMP report, note that all of the following restrictions apply to use the site: No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
L. Fuel Dispensing Areas	Fueling areas[1] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable. Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.		The property owner shall dry sweep the fueling area routinely. See the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

[1] The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
M. Loading Docks	Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas should be drained to the sanitary sewer where feasible. Direct connections to storm drains from depressed loading docks are prohibited. Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		Move loaded and unloaded items indoors as soon as possible. See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
N. Fire Sprinkler Test Water		Provide a means to drain fire sprinkler test water to the sanitary sewer.	See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
O. Miscellaneous Drain or Wash Water • Boiler drain lines • Condensate drain lines • Rooftop equipment • Drainage sumps • Roofing, gutters, and trim.		Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment. Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	
P. Plazas, sidewalks, and parking lots.			Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

STEP 7

LID AND TREATMENT CONTROL SELECTION

A treatment control BMP and/or LID facility must be selected to treat the project pollutants of concern identified in Table 7 "Project Pollutants of Concern". A treatment control facility with a high or medium pollutant removal efficiency for the project's most significant pollutant of concern shall be selected. It is recommended to use the design procedure in Chapter 4 of the SUSMP to meet NPDES permit LID requirements, treatment requirements, and flow control requirements. If your project does not utilize this approach, the project will need to demonstrate compliance with LID, treatment and flow control requirements. Review Chapter 2 "Selection of Stormwater Treatment Facilities" in the SUSMP to assist in determining the appropriate treatment facility for your project.

Will this project be utilizing the unified LID design procedure as described in Chapter 4 of the Local SUSMP? (*If yes, please document in Attachment D following the steps in Chapter 4 of the County SUSMP*)	
(Yes)	No
If this project is not utilizing the unified LID design procedure, please describe how the alternative treatment facilities will comply with applicable LID criteria, stormwater treatment criteria, and hydromodification management criteria.	

- Indicate the project pollutants of concern (POCs) from Table 7 in Column 2 below.

TABLE 10: GROUPING OF POTENTIAL POLLUTANTS of Concern (POCs) by fate during stormwater treatment

Pollutant	Check Project Specific POCs	Coarse Sediment and trash	Pollutants that tend to associate with fine particles during treatment	Pollutants that tend to be dissolved following treatment
Sediment	**x**	X	X	
Nutrients	**x**		X	X
Heavy Metals	**x**		X	
Organic Compounds	**x**		X	
Trash & Debris	**x**	X		
Oxygen Demanding	**x**		X	
Bacteria			X	
Oil & Grease	**x**		X	
Pesticides	**x**		X	

- Indicate the treatment facility(s) chosen for this project in the following table.

TABLE 11: GROUPS OF POLLUTANTS and relative effectiveness of treatment facilities

Pollutants of Concern	**Bioretention Facilities (LID)**	Settling Basins (Dry Ponds)	Wet Ponds and Constructed Wetlands	Infiltration Facilities or Practices (LID)	Media Filters	Higher-rate biofilters*	Higher-rate media filters*	Trash Racks & Hydro - dynamic Devices	**Vegetated Swales**
Coarse Sediment and Trash	**High**	High	High	High	High	High	High	High	**High**
Pollutants that tend to associate with fine particles during treatment	**High**	High	High	High	High	Medium	Medium	Low	**Medium**
Pollutants that tend to be dissolved following treatment	**Medium**	Low	Medium	High	Low	Low	Low	Low	**Low**

- Please check the box(s) that best describes the Treatment BMP(s) and/or LID BMP selected for this project.

TABLE 12: PROJECT LID AND TC-BMPS

Bioretention Facilites (LID)	
x	Bioretention area
	Flow-through Planter
	Cistern with Bioretention Facility
Settling Basins (Dry Ponds)	
	Extended/dry detention basin with grass/vegetated lining
	Extended/dry detention basin with impervious lining
Infiltration Facilities or Practices (LID)	
	Infiltration basin
	Dry well
	Infiltration trench
Wet Ponds and Constructed Wetlands	
	Wet pond/basin (permanent pool)
	Constructed wetland
Vegetated Swales (LID[(1)])	
x	Vegetated Swale
Media Filters	
	Austin Sand Filter
	Delaware Sand Filter
	Multi-Chambered Treatment Train (MCTT)
Higher-rate Biofilters	
	Tree-pit-style unit
	Other_____

Higher-rate Media Filters	
	Vault-based filtration unit with replaceable cartridges
	Other_____
Hydrodynamic Separator Systems	
	Swirl Concentrator
	Cyclone Separator
Trash Racks	
	Catch Basin Insert
	Catch Basin Insert w/ Hydrocarbon boom
	Other_____
Self-Treating or Self-Retaining Areas (LID)	
x	Pervious Pavements
	Vegetated Roofs
	Other_____

(1) Must be designed per SUSMP "Vegetated Swales" design criteria for LID credit (p. 65).

For design guidelines and calculations refer to Chapter 4 "Low Impact Development Design Guide" in the SUSMP. Please show all calculations and design sheets for all treatment facilities proposed in Attachment D.

- Create a Construction Plan SWMP Checklist for your project.

Instructions on how to fill out table

1. Number and list each measure or BMP you have specified in your SWMP in Columns 1 and Maintenance Category in Column 3 of the table. Leave Column 2 blank.

2. When you submit construction plans, duplicate the table (by photocopy or electronically). Now fill in Column 2, identifying the plan sheets where the BMPs are shown. List all plan sheets on which the BMP appears. This table must be shown on the front sheet of the grading and improvement plans.

Stormwater Treatment Control and LID BMP's			
Description / Type	Sheet	Maintenance Category	Revisions
1. Bioretention area		First	
2. Vegetated swale		First	
3. Pervious pavements		First	

* BMP's approved as part of Stormwater Management Plan (SWMP) dated xx/xx/xx on file with DPW. Any changes to the above BMP's will require SWMP revision and Plan Change approvals.

- Please describe why the chosen treatment BMP(s) was selected for this project. For projects utilizing a low performing BMP, please provide a feasibility analysis that demonstrates utilization of a treatment facility with a high or medium removal efficiency ranking is infeasible.

A vegetated swale and strips were chosen for the project based on their pollutant removal efficiency, low cost and maintenance and ability to decrease run-off velocity. Permeable asphalt paving will be used for the private road where the existing slope is less than 5%. This will help to reduce the amount of impervious surfaces being added to the site.

Construction BMPs:
Harbison Canyon Creek is dry through the project area when there is no rainfall. Construction of the dip section will only occur during months where history has shown rainfall is low. These months are typically between May and October. Silt fencing and gravel bags will be used for erosion control during construction of the dip section. Gravel bags will also be used throughout the rest of the project during construction as well as a stabilized construction entrance.

A Treatment BMP must address runoff from developed areas. Please provide the postconstruction water quality treatment volume or flow values for the selected project Treatment BMP(s). Guidelines for design calculations are located in Chapter 4 of the County SUSMP. Label outfalls on the BMP map. The Water Quality peak rate of discharge flow (QWQ) and the Water Quality storage volume (VWQ) is dependent on the type of treatment BMP selected for the project.

Outfall	Tributary Area (acres)	QWQ (cfs)	VWQ (ft^3)
Proposed road	0.45	0.24	n/a

STEP 8

OPERATION AND MAINTENANCE

- Please check the box that best describes the maintenance mechanism(s) for this project.

TABLE 13: PROJECT BMP CATEGORY

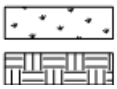
CATEGORY	SELECTED		BMP Description
	YES	NO	
First	**x**		Biofilters
Second[1]		**x**	
Third[2]		**x**	
Fourth		**x**	

Note:

1. A recorded maintenance agreement will be required.
2. Project will be required to establish or be included in a Stormwater Maintenance Assessment District for the long-term maintenance of treatment BMPs.

- Please list all individual LID and Treatment Control BMPs (TC-BMPs) incorporated into project. Please ensure the "BMP Identifier" is consistent with the legend in Attachment C "LID and/or TC-BMP Exhibit". Please attach the record plan sheets upon completion of project and amend the Major SWMP where appropriate. For each type of LID or TC-BMP provide an inspection sheet in Attachment F "Maintenance Plan".

TABLE 14: PROJECT SPECIFIC LID AND TC-BMPS

BMP Identifier*	LID or TC-BMP Type	BMP Pollutant of Concern Efficiency (H,M,L) – Table 11	Final Construction Date *(to be completed by County inspector)*	Final Construction Inspector Name *(to be completed by County inspector)*
	Bioretention facilities	H, H, M		
	Vegetated swales	H, M, L		

* For location of BMP's, see approved Record Plan dated _XX/XX/XX_, plan (TYPE) sheet _ (#) _.

- Responsible Party for Long-term Maintenance:

Identify the parties responsible for long-term maintenance of the BMPs identified above and Source Controls specified in Attachment B. Include the appropriate written agreement with the entities responsible for O&M in Attachment F. Please see Chapter 5 "Private Ownership and Maintenance" on page 94 of the County SUSMP for appropriate maintenance mechanisms.

Individual owners will be responsible for the long term operation and maintenance of the indentified BMPs.

- Funding Source:

Provide the funding source or sources for long-term operation and maintenance of each BMP identified above. By certifying the Major SWMP the applicant is certifying that the funding responsibilities have been addressed and will be transferred to future owners.

A funding source is not required for First Category BMPs.

ATTACHMENTS

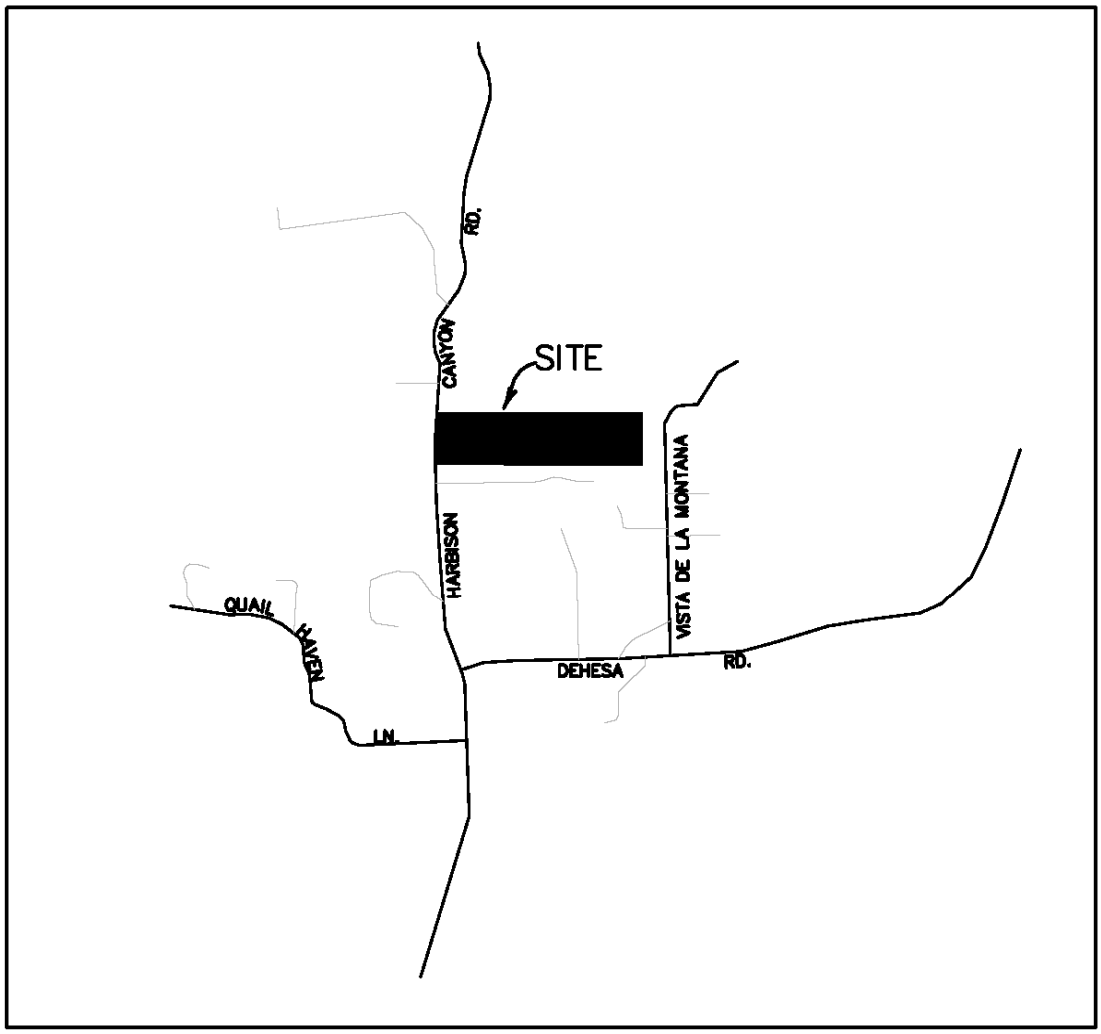
Please include the following attachments.

	ATTACHMENT	COMPLETED	N/A
A	Project Location Map	**x**	
B	Source Control Exhibit	**x**	
C	LID and/or TC-BMP Exhibit	**x**	
D	Drainage Management Area (DMA) Maps, Sizing Design Calculations and BMP/IMP Design Details	**x**	
E	Geotechnical Certification Sheet	**x**	
F	Maintenance Plan	**x**	
G	Tracking Report	**x**	
H	Addendum		**x**

Note: Attachments B and C may be combined.

ATTACHMENT A

Project Location Map



VICINITY MAP

NO SCALE

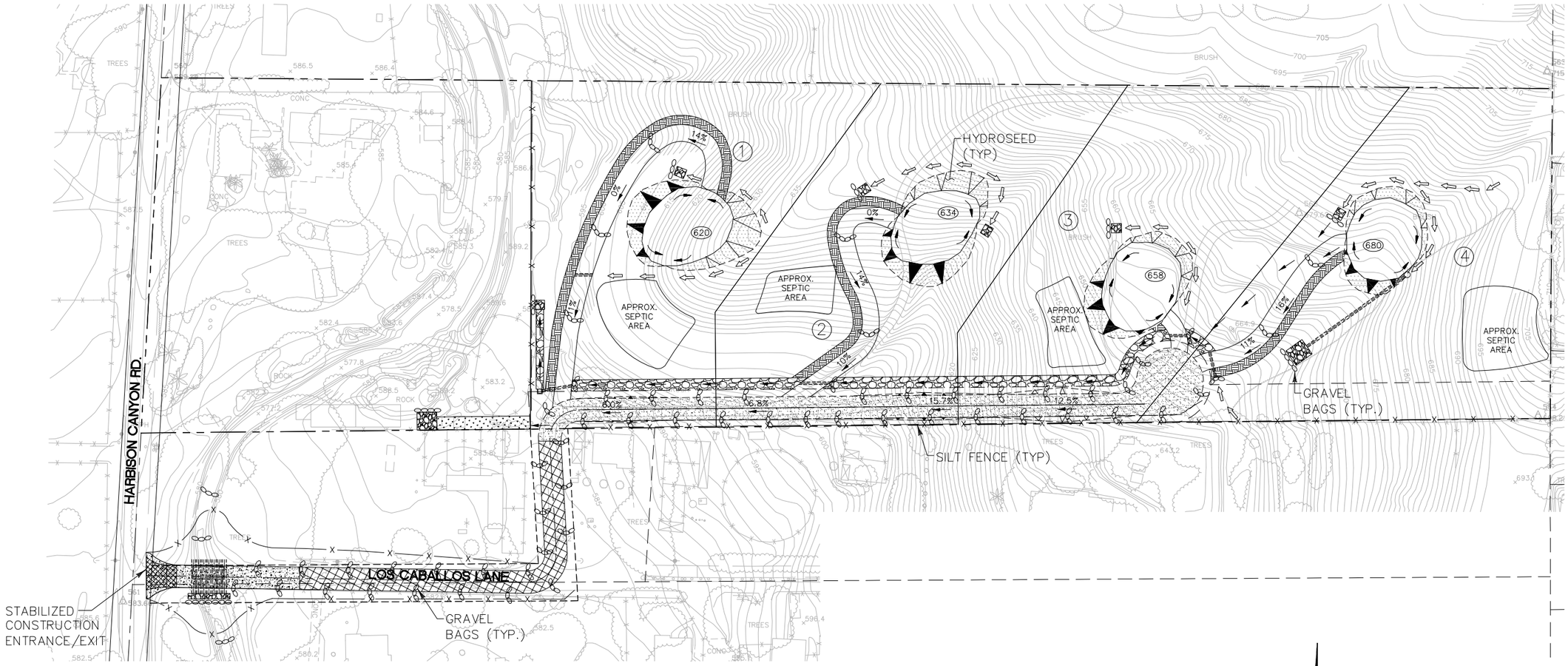
THOMAS BROTHERS GUIDE PAGE: 1253, B-5

ATTACHMENT B

Source Control Exhibit

LEGEND:

- CONSTRUCTION ENTRANCE
- HYRDOSEED
- GRAVEL BAGS
- SILT FENCE



PROJECT SOURCE CONTROL BMP'S

POTENTIAL SOURCE OF RUNOFF POLLUTANTS	PERMANENT SOURCE CONTROL BMP'S	OPERATIONAL SOURCE CONTROL BMP'S
SEDIMENTS	VEGETATED SLOPES	N/A

N

1 FT CONTOUR INTERVALS

60 0 60 180

SCALE: 1"=60'

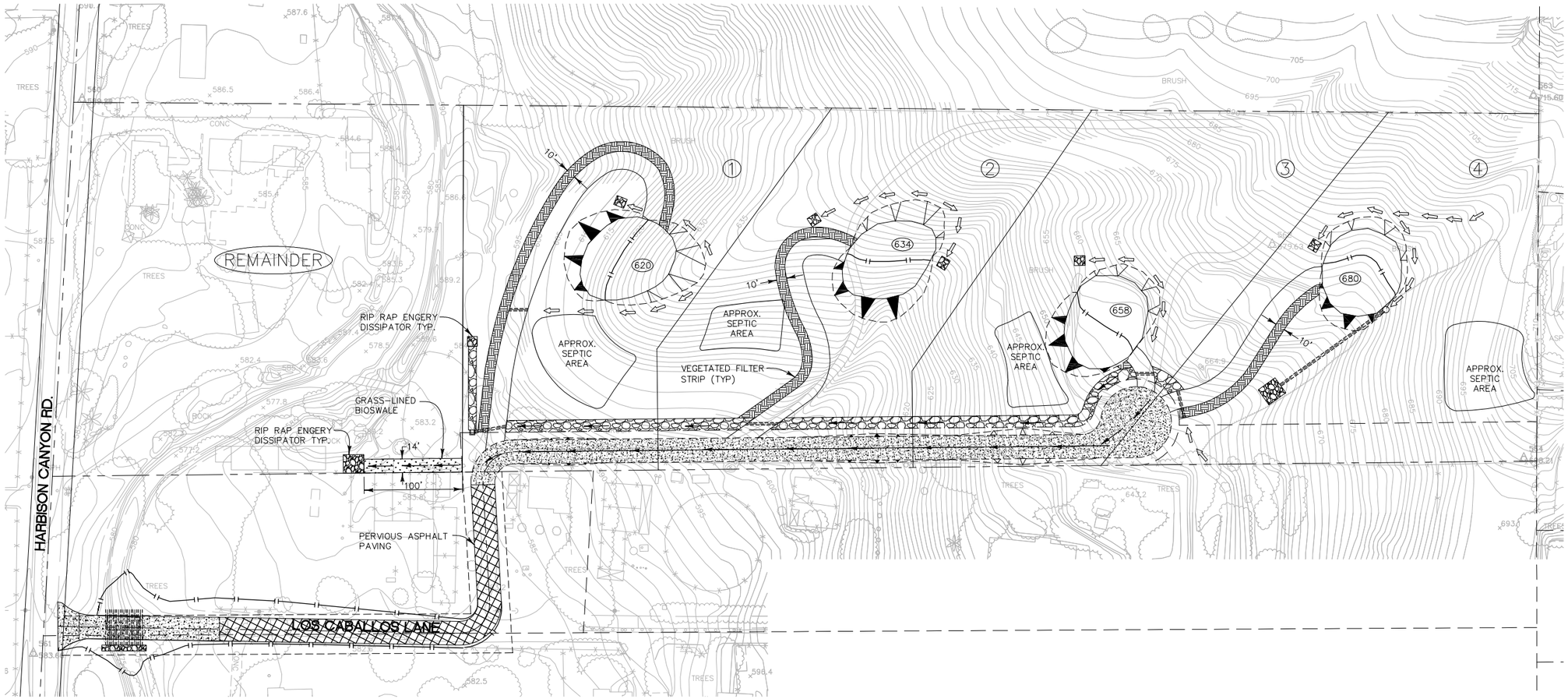
SOURCE CONTROL BMP LOCATION MAP

DATE: 11-18-10	W.O. KCNV 0002	DRFT: NY	CHK'D BY: PM

DAVID EVANS AND ASSOCIATES INC.
110 West A Street Suite 1700
San Diego California 92101
Phone: 619.400.0600

ATTACHMENT C

LID and/or TC-BMP Exhibit



LEGEND:

DRAINAGE BASIN

DIRECTION OF FLOW

TREATMENT BMP'S:

GRASS BIOSWALE

VEGETATED FILTER STRIPS

LID:

DITCH

COBBLE-LINED DITCH

PERVIOUS PAVING

ROCK RIP RAP

1 FT CONTOUR INTERVALS

60 0 60 120

SCALE: 1"=60'

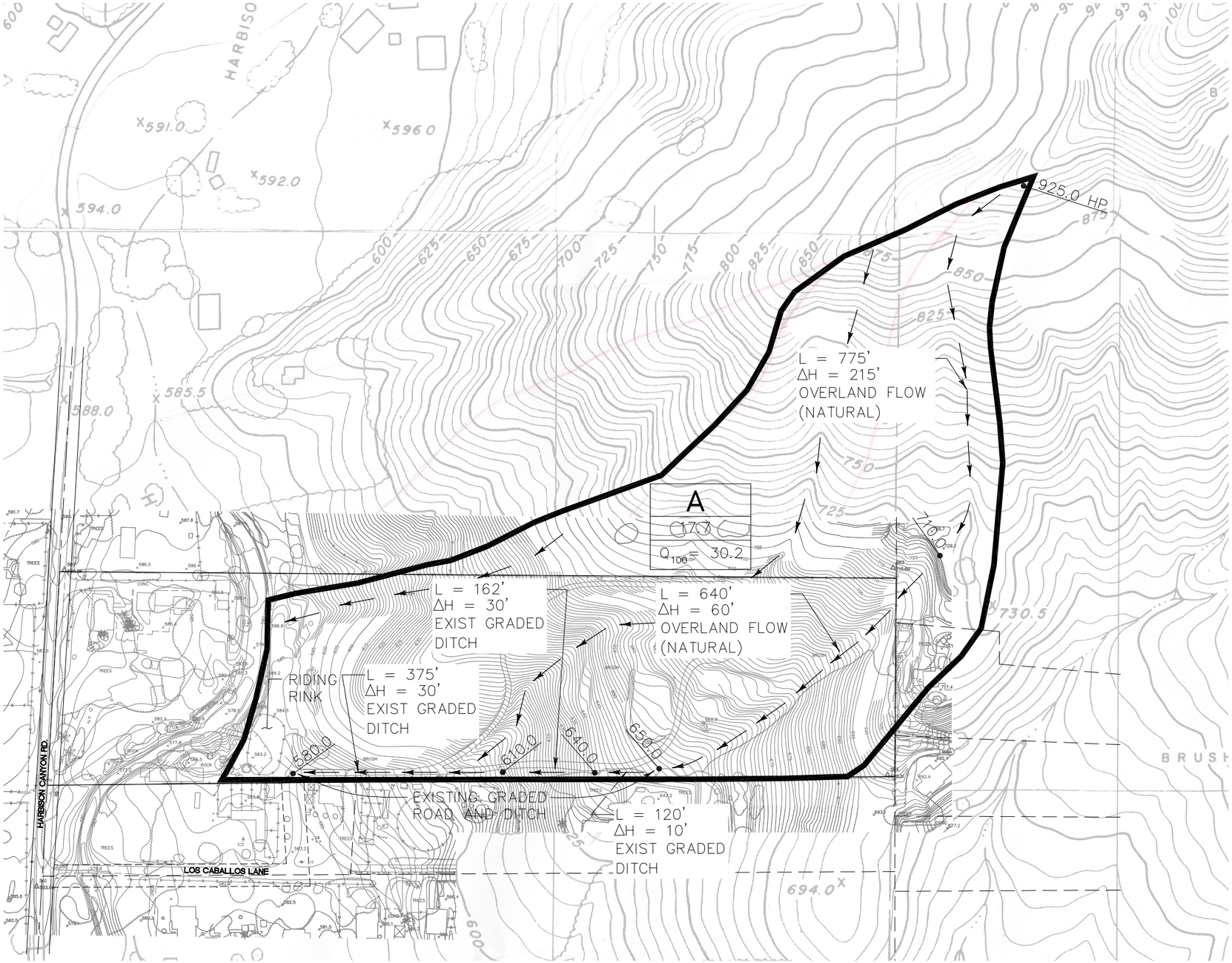
LID/TC-BMP LOCATION MAP

DATE: 11-18-10	W.O. 12594	DRFT: NY	CHK'D BY: PM

DAVID EVANS AND ASSOCIATES INC.
1700 West A Street Suite 1700
San Diego California 92101
Phone: 619.400.0600

ATTACHMENT D

Drainage Management Area (DMA) Maps, Sizing Design Calculations and TC-BMP/LID Design Details



LEGEND:

A	BASIN DESIGNATOR
1.3	AREA (ACRES)
Q_{100}=X.X	RUNOFF VOLUME (CFS)
	DRAINAGE BASIN
	DIRECTION OF FLOW

1 FT CONTOUR INTERVALS

200 0 200 600

SCALE: 1"=200'

EXISTING CONDITIONS HYDROLOGY MAP (100 YEAR EVENT)

DATE: 6-2-2010	W.O. KCNV 02	DRFT: SNYO	CHK'D BY: PMM

DAVID EVANS AND ASSOCIATES INC.
110 West A Street Suite 1700
San Diego California 92101
Phone: 600.400.0600

LEGEND:

A
1.3
Q_{50}=X.X

BASIN DESIGNATOR
AREA (ACRES)
RUNOFF VOLUME (CFS)

DRAINAGE BASIN

DIRECTION OF FLOW

NOTE: SEE "PROPOSED CONDITIONS HYDROLOGY MAP – DETAIL" FOR 100-SCALE DETAIL OF DRAINAGE SYSTEM FEATURES.

200 0 200 600

SCALE: 1"=200'

PROPOSED CONDITIONS HYDROLOGY MAP (100 YEAR EVENT)

DATE: 11-18-2010	W.O. KCNV 02	DRFT: SNYO	CHK'D BY: PMM

DAVID EVANS AND ASSOCIATES INC.
110 West A Street Suite 1700
San Diego California 92101
Phone: 600.400.0600

LEGEND:

A
1.3
Q_{50}=X.X

BASIN DESIGNATOR
AREA (ACRES)
RUNOFF VOLUME (CFS)

DRAINAGE BASIN

DIRECTION OF FLOW

NOTE: SEE "PROPOSED CONDITIONS HYDROLOGY MAP – DETAIL" FOR 100-SCALE DETAIL OF DRAINAGE SYSTEM FEATURES.

A
17.7
Q_{100}= 30.0

L = 970'
ΔH = 232'
OVERLAND FLOW
(NATURAL)

925.0 HP

L = 85'
ΔH = 0.4'
COBBLE-LINED
DITCH

L = 30'
ΔH = 1.5'
PIPE FLOW
(P-2)

L = 220'
ΔH = 25'
OVERLAND FLOW
(NATURAL)

L = 180'
ΔH =10'
CONC. DITCH

L = 33'
ΔH = 1'
PIPE FLOW
(P-3)

L = 245'
ΔH = 16'
COBBLE-LINED
DITCH

L = 390'
ΔH = 52.8'
COBBLE-LINED
DITCH

L = 20'
ΔH = 1'
PIPE FLOW (P-1)

REMAINDER

HARBISON CANYON CREEK

HARBISON CANYON RD.

OB CABALLOS CANE

HARBISON

BRUSH

200 0 200 600

SCALE: 1"=200'

PROPOSED CONDITIONS HYDROLOGY MAP (100 YEAR EVENT)

DATE: 11-18-2010	W.O. KCNV 02	DRFT: SNYO	CHK'D BY: PMM

DAVID EVANS AND ASSOCIATES INC.
110 West A Street Suite 1700
San Diego California 92101
Phone: 600.400.0600

Carnevale Subdivision TM 21133

PROPOSED RUNOFF CALCULATIONS

Q_{WQ}=CIA

WHERE:

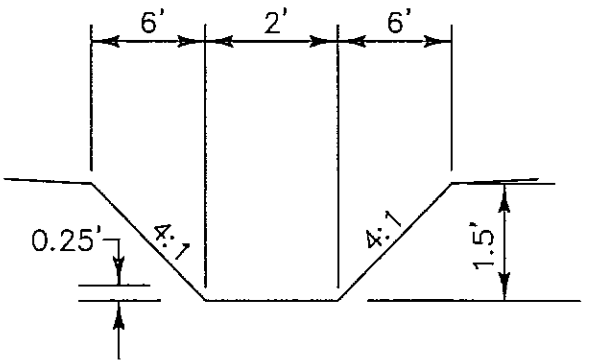
Q_{WQ} = Flow rate in cubic feet per second (cfs)

I = Intensity in inches/hour = $7.44*P_6*T_C^{-0.645}$

T_C = 5 min (assumed

A = Basin area in acres

OUTFALL	C	AREA	P 6 HR STORM	INTENSITY	BASIN Q
PROP ROAD	0.95	0.45	2.9	7.6	3.3



Q_{100} = 3.80 cfs (REQUIRED)

S = 1% d = 1.5' n = 0.03 (flowing full)

A = 1/2(2+14)1.5 = 12 sf P = 2 + 2(6.2) = 14.4

R = A/P = 12/14.4 = 0.83

$Q_{100} = \frac{1.49}{0.03}(0.83)^{2/3}(0.01)^{1/2}(12) = 52.6$ cfs

At low flows,

S = 1.0% d = 0.25' n = 0.15 L = 100'

A = 1/2(2 + 4)(0.25) = 0.75 P = 2 + 2(1) = 4 R = 0.1875

$WQF = \frac{1.49}{0.15}(0.1875)^{2/3}(0.01)^{1/2}(0.75) = 0.24$ cfs

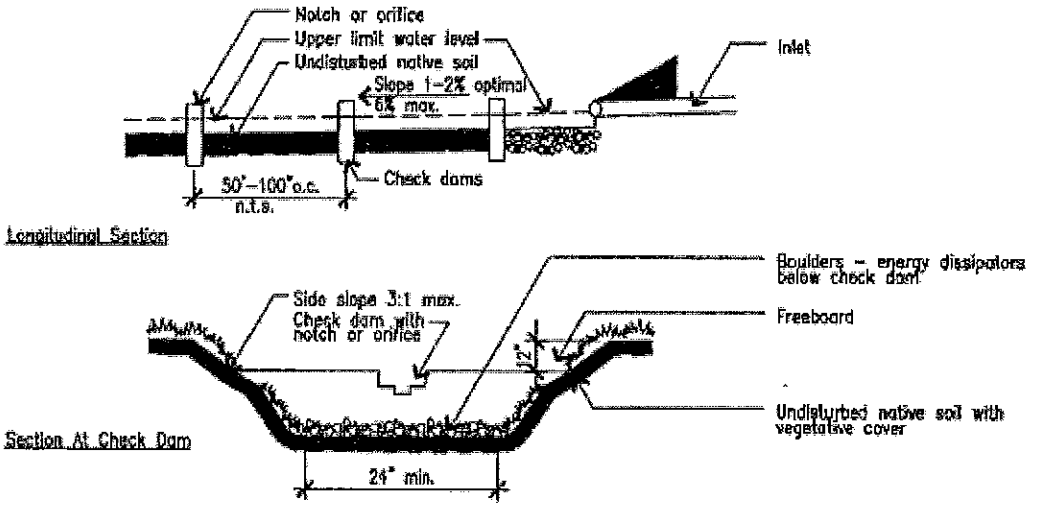
$V = \frac{Q}{A} = \frac{0.24}{0.75} = 0.32$ ft/s

$HRT = \frac{100'}{0.32} = \frac{312.5}{60} = 5.2$ min

BIOSWALE A

NOT TO SCALE

Fact Sheet 4. Vegetated Swale / Rock Swale



Conditions, dimensions, and materials shown are typical. Modifications may be required for proper application, consult qualified professional.

Vegetated / rock swales are vegetated or rock lined earthen channels that collect, convey, and filter site water runoff and remove pollutants. Swales are an alternative to lined channels and pipes; configuration and setting are unique to each site.

CHARACTERISTICS

- If properly designed and maintained, swales can last for at least 50 years.
- Can be used in all soil types, natural or amended.
- When swales are not holding water, they appear as a typical landscaped area.
- Water is filtered by vegetation/rocks and pollutants are removed by infiltration into the subsurface of the soil.
- Swales also serve to delay runoff peaks by reducing flow velocities.

APPLICATION

- Swales are most effective in removing coarse to medium sized sediments.
- Parking lot medians, perimeters of impervious pavements.
- Street and highway medians, edges (in lieu of curb and gutter, where appropriate).
- In combination with constructed treatment systems or sand filters.

DESIGN

- Vegetation of each swale is unique to the setting, function, climate, geology, and character of each site and climatic condition.
- Can be designed with natural or amended soils, depending on the infiltration rate provided by the natural condition versus the rate needed to reduce surface runoff .
- Grass swales move water more quickly than vegetated swales. A grass swale is planted with salt grass; a vegetated swale is planted with bunch grass, shrubs or trees.
- Rocks, gravel, boulders, and/or cobbles help slow peak velocity, allow sedimentation, and add aesthetic value.

- Pollutant removal effectiveness can be maximized by increasing residence time of water in swale using weirs or check dams.
- Swales are often used as an alternative to curbs and gutters along roadways, but can also be used to convey stormwater flows in recreation areas and parking lots.
- Calculations should also be provided proving the swale capable of safely conveying the 100-year flow to the swale without flooding adjacent property or infrastructure.
- See County of San Diego Drainage Design Manual for design criteria. (section 5.5) http://www.sdcounty.ca.gov/dpw/docs/hydrologymanual.pdf

MAINTENANCE

- Swale maintenance includes mowing and removing clippings and litter. Vegetated swales may require additional maintenance of plants.
- Periodically remove sediment accumulation at top of bank, in swale bed, or behind check dams.
- Monitor for erosion and reseed grass or replace plants, erosion control netting and mulch as necessary. Fertilize and replace vegetation well in advance of rainy season to minimize water quality degradation.
- Regular inspections and maintenance is required during the establishment period.

LIMITATIONS

- Only suitable for grades between 1% and 6%; when greater than 2.5% should be paired with weir or check dam.
- "Turf" swales will commonly require irrigation and may not meet State water conservation goals.
- Irrigated vegetation is not appropriate in certain sites. Xeriscape techniques, natural stone and rock linings should be used as an alternative to turf.
- Wider road corridors may be required to incorporate swales.
- Contributing drainage areas should be sized to meet the stormwater management objective given the amount of flow that will be produced.
- When contributing flow could cause formation of low-flow channel, channel dividers must be constructed to direct flow and prevent erosion.

ECONOMICS

- Estimated grass swale construction cost per linear foot $4.50-$8.50 (from seed) to $15-20 (from sod), compare to $2 per inch of diameter underground pipe e.g., a 12" pipe would cost $24 per linear foot).
- $0.75 annual maintenance cost per linear foot

REFERENCES

- CALTRANS – Storm Water Handbook (cabmphandbooks.com)
- For additional information pertaining to Swales, see the works cited in the San Diego County LID Literature Index.

Fact Sheet 5. Vegetated Filter Strips

A filter strip (or "buffer strip") is an area of either planted or native vegetation, situated between a potential, pollutant-source area and a surface-water body that receives runoff. Vegetated filter strips are broad sloped open vegetated areas that accept shallow runoff from surrounding areas as distributed sheet flow.

CHARACTERISICS

- Can serve to remove sediments by filtration through the vegetation, reducing runoff volumes, and delaying runoff peaks by reducing flow velocities.
- A properly designed and operating filter strip provides water-quality protection by reducing the amount of sediment, organic matter, nutrients and pesticides in the runoff at the edge of the field, and before the runoff enters the surface-water body.
- Filter strips also provide localized erosion protection since the vegetation covers an area of soil that otherwise might have a high erosion potential.
- Often constructed along road, parking-lot, stream, lake, pond or sinkhole boundaries, filter strips installed on cropland not only help remove pollutants from runoff, but also serve as habitat for wildlife.

APPLICATION

- Most effective in removing coarse to medium sediments and attached pollutants (such as nutrients, free oils/grease and metals).
- Typically used in conjunction with swales as an alternative to curb and gutter and can form part of a multi-use corridor.
- Typically used as a pre-treatment for other stormwater treatment devices (treatment train).

DESIGN

- The proper application of a filter strip should consider the type and quantity of the potential pollutant (sediment, nutrient, pesticide, organic matter, etc.), soil characteristics (clay and organic matter content, infiltration rate, permeability, etc.), slope steepness, shape and area of the field draining into the filter.
- Can be designed with natural or amended soils, depending on the infiltration rate provided by the natural condition versus the rate needed to reduce surface runoff .
- Most effective when used on gradually sloping areas
- The type of vegetation most suitable for the site should be decided based on soil type, potential pollutant sources/types, infiltration needs, etc.
- Once the type of vegetation is selected, soil fertility should be evaluated, and the seeding method selected.

MAINTENANCE

- Filter strips must be inspected after intense rainfall events and runoff events of long duration because small breaks in the sod and small erosion channels quickly become large problems.

- Minimize the development of erosion channels within the filter. Even small channels may allow much of the runoff from the field to bypass the filter. These areas should be repaired and reseeded immediately to help ensure proper flow of runoff through the filter.
- Periodic soil testing should occur and soil amendments should be applied as needed.
- Weeding may be necessary to reduce or eliminate weeds that could compromise the filter strip's effectiveness.

LIMITATIONS

- "Turf" buffer strips will commonly require irrigation and may not meet State water conservation goals.
- Irrigated vegetation may not be appropriate in certain sites. Xeriscape techniques, natural stone and rock linings can be used as an alternative to turf.
- Requires adequate sunlight for plant growth
- Effectiveness is dependant on soil characteristics, slope steepness, landscape shape, the ratio of the filter area to the area generating the runoff, filter width, and the type and quality of the vegetation in the filter.
- Regular inspections and maintenance is required, particularly during the establishment period.
- Requires sufficient space and designed large enough to meet the stormwater management objective given the amount of flow that will be produced.

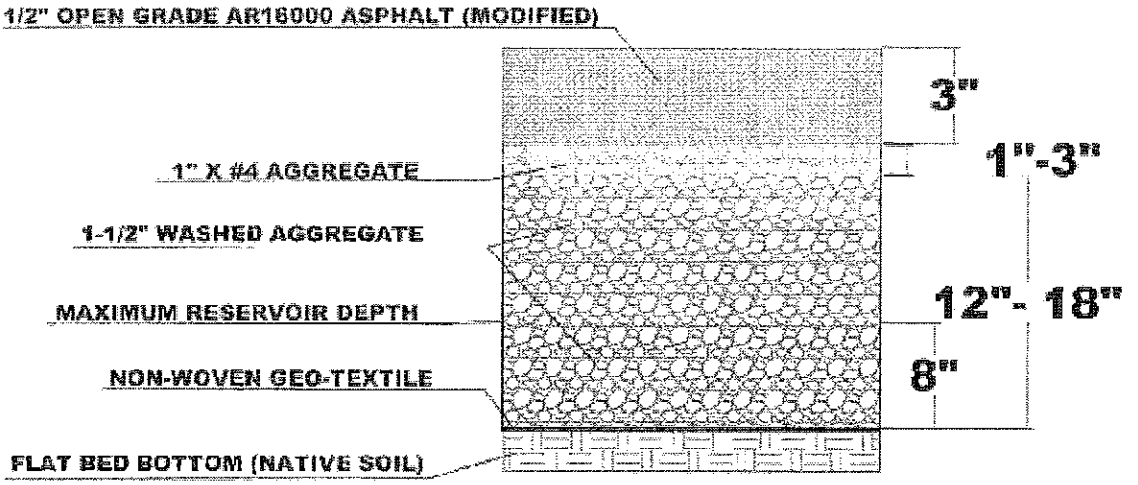
ECONOMICS

- Installation costs for filter strips may be estimated by considering the amount of grading, seeding, and establishment required for the site. Filter strip installation costs are similar to those of vegetative swales, and typically lower than costs for bioretention swales with soil amendment or sand media filtration devices (2003 CASQA Development Handbook Tables 5-4 and 5-5).

REFERENCES

- California Stormwater Quality Association. (2003, January) California Stormwater BMP Handbook: New Development and Redevelopment.
- Leeds, R., Brown, L. C., Sulc, M. R., VanLieshout, L, (n. d.) Vegetated Filter Strips: Application, Installation, and Maintenance. *Food, Agriculture and Biological Engineering*. Ohio State University Extension. http://ohioline.osu.edu/aex-fact/0467.html0
- URS Australia Pty Ltd, (2004, May), Water Sensitive Urban Design: Technical Guidelines for Western Sydney, Upper Parramatta River Catchment Trust. Section 3.
- Southeastern Wisconsin Regional Planning Commission (1991). Costs of Urban Nonpoint Source Water Pollution Control Measures. Technical Report No. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI.
- For additional information pertaining to Filter Strips, see the works cited in the San Diego County LID Literature Index.

Fact Sheet 9. Permeable Asphalt-Concrete (AC)



From the County of San Diego, Department of General Services, Permeable Pavement Study.

Permeable AC may be suitable for light to medium duty applications such as residential access roads, residential street parking lanes, parking lots, overflow parking areas, utility access, sidewalks, bike paths, maintenance walkways/trails, residential driveways, stopping lanes on divided highways, and patios.

CHARACTERISTICS

- Flexible, poured-in-place slab
- Appearance similar to conventional asphalt, though rougher surface.
- Rough, coarse surface improves traction in wet conditions, but may result in a rough ride.
- An open-graded crushed aggregate base reservoir for water storage is a critical component of a permeable AC installation, especially in areas with low permeability soils.
- Curb and gutter system may not be necessary to control low flow.
- Runoff coefficient: very low to nil (can infiltrate 50-150 cm/h [20-60"/h])
- Reduces impervious land coverage

APPLICATION

- For use in areas with mid-low traffic use, such as travel lanes, parking stalls, and especially well suited in parking lots.
- Flat sites (slope < 5%) with uniform, permeable subgrade.
- Not appropriate for gas stations, truck stops, or other areas in which hydrocarbon leaching occurs.
- Required pre-construction fire access roads must be constructed of conventional pavements due to construction sediments/fines.

DESIGN

- Install during a late phase of construction so that runoff will not enter and clog pavement pores.

- Subgrade and base rock design must be determined by a qualified professional according to soil conditions and intended use or anticipated loads.
- Base of open-graded crushed aggregate with no fine sands. Must be designed to support surface uses, allow water to flow through, and prevent migration of subbase soils.
- AC mix void content of 12-20%
- Filter fabric may be required below base course.
- Special tools are required for installation.
- Use a single size grading to provide open voids in the gravel subbase
- Erosion and sediment from surrounding areas must be strictly controlled during and after construction to prevent clogging of void spaces.
- Install permeable AC towards the end of construction activities to minimize sediment transport and clogging of pores
- During construction, do not allow construction or heavy vehicles to traverse excavated recharge beds or areas of newly completed permeable pavement.
- A qualified, licensed professional should verify the location of a permeable AC installation and subgrade preparation as appropriate for infiltration.
- Subgrade and base rock design must be determined by a qualified professional according to soil conditions and intended use or anticipated loads.
- During emplacement of permeable AC, boards should be used to separate individual pours and to produce uniform seams between adjacent pours.
- Permeable AC is stickier than conventional asphalt and a citron based releasing agent should be used to clean asphalt buildup from the supply truck bed.
- The surface of each pour should be finished as soon as possible as permeable AC can set up very rapidly in our local arid environment.
- In areas with low permeability soil, an under-drain system may be needed.

MAINTENANCE

- The overall maintenance goal is to avoid clogging of the void spaces.
- Inspect permeable AC several times during the first few storms to insure proper infiltration and drainage. After the first year, inspect at least one time per year.
- Permeable pavements and materials should be cleaned with a vacuum-type street cleaner a minimum of twice a year.
- Hand held pressure washers can be effective for cleaning the void spaces of small areas.
- Failures have been reported when pavements have been located down slope from an erosive soil and sediment is allowed to wash over the pavement. Caution must be taken during construction phase.
- Maintenance personnel must be educated and instructed not to seal or pave with non-porous materials.
- Small areas of damaged or removed permeable pavement can be repaired with conventional asphalt if drained to adjacent permeable AC.

LIMITATIONS

- Not applicable where the seasonal high groundwater table is closer than 10 feet below the bottom of the gravel subbase unless designed with an under-drain.
- Avoid using permeable pavements in close proximity to underground utilities. If it is necessary to use permeable pavements in these areas, care must be taken to keep infiltrated water form migrating into utility trench bedding.
- Permeable AC may become clogged if not protected from sediment, or when not maintained.
- Applications with under-drain systems are typically more expensive than conventional asphalt
- Permeable AC should be avoided in drainage areas with activities that generate highly contaminated runoff.

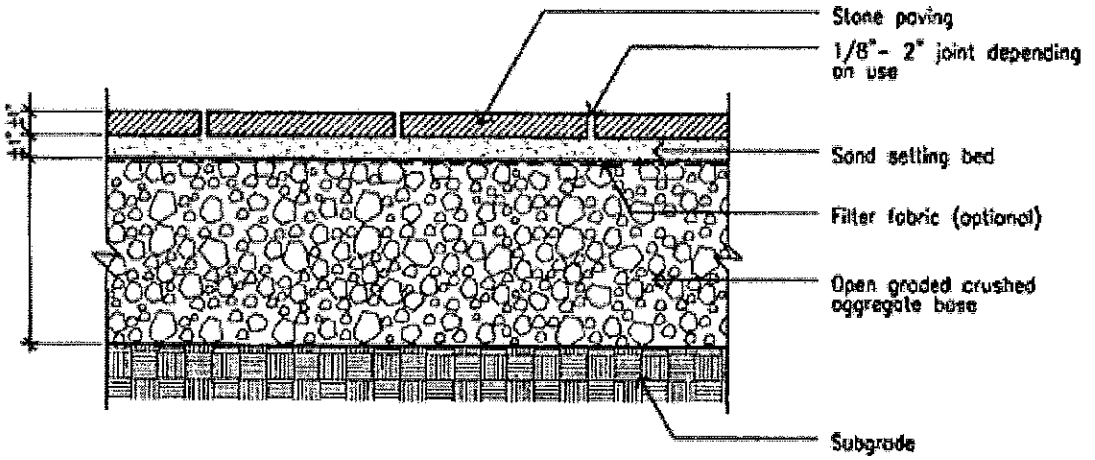
ECONOMICS

- Up to 50% more than conventional asphalt pavement.
- Costs can be offset by savings in reducing or eliminating curb and gutter drainage system.
- Maintenance cost up to 1-2% of construction cost annually.

REFERENCES

- Cahill Associates – East Whiteland Township, Chester County, PA
- Ferguson, Bruce K. (2005). Porous Pavements: Integrative studies in water management and land development. CRC Press, Boca Raton, Florida.
- For additional information pertaining to Pervious Asphalt Concrete, see the works cited in the San Diego County LID Literature Index.

Fact Sheet 10. Unit Pavers



There are a variety of unit paver types that provide a pervious ground surface suitable for a variety of applications. Open celled unit pavers (turf block), brick paving, natural stone pavers, and solid pre-cast concrete unit pavers are all examples of unit pavers that can provide an attractive pavement with the added benefit of decreasing a development's impervious area.

CHARACTERISTICS

- Units vary in size, weight, surface characteristics, strength, durability, proportion of open area, interlocking capability, runoff characteristics, and cost.
- Units can be filled with gravel, stone, or salt grass turf.
- Turf units require deep-rooted grass species that can penetrate reservoir base course.
- Curbs and gutters are generally not necessary to control low flow.
- Runoff coefficient is generally between 0.13 and 0.8, but varies depending on rainfall intensity, joint spacing and paver type.
- Permeability is directly related to the permeability of the subgrade.
- Reduces impervious land coverage.
- Pavers are available in a variety of materials of varying colors, textures, shapes and finishes.
- Load bearing capacity is dependant upon the type of paver used.

APPLICATION

- Application varies based upon paver type.
- Areas of low flow traffic and infrequent parking such as residential driveways, overflow parking areas, fire/ emergency access roads, utility roads, pedestrian paths and jogging trails, and street shoulders are appropriate locations for turf block.

- Brick pavers, concrete pavers and natural stone pavers are generally suitable for driveways, walkways, patios, public sidewalks, parking lots, plazas, and low volume streets.

DESIGN

- Flat sites (slope < 5%) with uniform, permeable subgrade.
- To maximize permeability, use an open-graded crushed rock base course in reservoir design (not rounded pea gravels or fines).
- Subgrade must be designed for anticipated loads.
- Provide under drain system where there are no deep permeable soils.
- Avoid using permeable pavers in areas with underground utilities. If it is necessary to use permeable pavers in these areas, care must be taken to keep infiltrated water form migrating into utility trench bedding.
- Because bricks and natural stone are laid loose, the field for these pavers must be enclosed by a rigid frame. Concrete, mortared brick on a concrete grade beam, redwood header, and metal edging are commonly used.
- Erosion and sediment introduction from surrounding areas must be strictly controlled during and after construction to prevent clogging of void spaces in base material and permeable surface.
- Runoff should enter the system after pre-treatment through other treatment train controls (i.e. buffer strips, drainage swales, etc.).
- Filter fabric should be placed on the bottom and sides of the subbase layer.
- Permeable pavers should be the last element installed during construction or redevelopment.
- Utilization of correct design specifications is essential for adequate infiltration, storage, and structural integrity of permeable paving systems.
- Contractors should be trained and have experience with installation.

MAINTENANCE

- Longevity ensured by locating in low erosion conditions, quality construction, and installation of good base layer.
- Easy to repair, since units are easily lifted and reset.
- Periodically add joint material (i.e. sand) to replace material that has been moved or worn by traffic or weather.
- Occasional weed suppression may be required.
- Turf units may need occasional reseeding and have similar maintenance of a regular lawn, requiring mowing, fertilization, and irrigation.
- Concrete pavers should not be washed to remove debris and sediment in the openings between pavers, rather sweeping with suction should be utilized.
- Pavers can be removed individually and replaced when utility work is needed.
- Top course aggregate can be removed or replaced in open-celled unit paving systems if they become clogged or contaminated.
- In open-celled unit pavers, grid segments should be replaced when three or more adjacent rings are broken or damaged.
- Must not be sealed with non-porous materials.

LIMITATIONS

- Concrete block is bulkier with smaller openings for soil and infiltration. The concrete draws the moisture out of the soil which tends to dry out the grass in hot, dry weather.
- Turf swales will commonly require irrigation and may not meet State water conservation goals.
- Irrigated vegetation is not appropriate in certain sites. Gravel/rock fill may be necessary in these sites.
- Permeability is directly related to the permeability of the subgrade.
- Some paver types are not suitable for all day parking, heavy use or areas with turning movements because grass gets insufficient sun for optimal growth or is suppressed by constant abrasion.
- Avoid using permeable pavements in close proximity to underground utilities. If it is necessary to use permeable pavements in these areas, care must be taken to keep infiltrated water form migrating into utility trench bedding.
- Due to the irregular surface area that can occur with permeable pavers, permeable pavers shouldn't be considered for disabled parking spaces and walkways.
- Areas with high water tables, impermeable soil layers, or shallow depth to bedrock may not be suitable as infiltration areas with an open-graded base.
- Not recommended in areas with high grease or oil loads, such as near restaurant waste disposal areas, gas stations and truck stops.
- Not recommended in areas where high sediment loads are deposited on the surface, such as downslope of steep, erosion-prone areas.
- Modular blocks are not recommended for slopes exceeding 10 percent.

ECONOMICS

- $4-$25 per square foot, installed, depending on paver type used.
- Generally more expensive than concrete or asphalt pavements.
- The cost of concrete unit pavers is generally the lowest of all unit pavers, though it can vary depending on shipping, special colors or finishes.

REFERENCES

- Guadalupe River Project, San José, CA. Emergency access/fire lane.
- University of Miami Orange Bowl Stadium, Miami, FL. Parking lot with asphalt aisles, and turf block stalls,
- Ferguson, Bruce K. (2005). Porous Pavements: Integrative studies in water management and land development. CRC Press, Boca Raton, Florida.
- For additional information pertaining to Unit Pavers, see the works cited in the San Diego County LID Literature Index.

ATTACHMENT E

Geotechnical Certification Sheet

The design of stormwater treatment and other control measures proposed in this plan requiring specific soil infiltration characteristics and/or geological conditions has been reviewed and approved by a registered Civil Engineer, Geotechnical Engineer, or Geologist in the State of California.

Not applicable.

ATTACHMENT F

MAINTENANCE PLAN

(Use Chapter 5 of the SUSMP as guidance in developing your Maintenance Plan)

See Treatment BMP fact sheets in Appendix D for maintenance schedules. All proposed Treatment BMPs will be maintained by the individual homeowners.

Esitmated annual cost for maintenance for both the vegetated swale and strips is approximately $0.75 per linear foot. The total cost varies per lot. The homeowners will be responsible for the annual maintenance cost of the treatment BMPs.

The estimated annual maintenance cost for the permeable asphalt paving for the private road is approximately $300.

ATTACHMENT G

Tracking Report

ATTACHMENT H

Addendum